With Mr Adams Compts

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ANNUAL REPORT

OF THE

Medical Officer of Health

FOR THE

BOROUGH OF MAIDSTONE.

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Borough of Maidstone.

REPORT OF THE MEDICAL OFFICER OF HEALTH,

FOR THE YEAR 1894.

TO THE LOCAL BOARD.

MR. MAYOR AND GENTLEMEN,

I have the honour to submit the following Report upon the Sanitary affairs of the Borough of Maidstone.

The vital statistics are calculated upon an estimated population for the middle of the year 1894, amounting to 33,011 persons, distributed between the two divisions of the Borough as follows:—

East Maidstone	16,931
West ,,	16,080
Whole Borough	33,011

From out of this population there were

Registered Births	862
,, Deaths	460
Showing an excess of Births over Deaths of	402

which constitutes our natural increment of population.

The number of persons married was 508; so that the rates per annum per thousand of population were:—

Of Births	26·11
,, Deaths	13·93
,, Marriages	15·38

BIRTHS.—In East Maidstone, the Births numbered 493 = 29·11 per thousand; in West Maidstone, 369 = 22·94 per thousand; 2·43 per cent. of those in East, and 2·98 per cent of those in West were illegitimate, against a mean for Kent of 3·9 and for all England of 4·2. So that the mean Birth rate of Maidstone for 1894, though decidedly better than that for 1893, is 3·49 below the average, for England and Wales for 1894, 29·6, which by the way, is the lowest Birth rate ever recorded for England and Wales.

DEATHS.—In East Maidstone there were 264 deaths = 15·59 per thousand; and in West Maidstone 196 deaths = 12·19 per thousand; the mean for England and Wales for the same period being 16·6, which also was the lowest ever recorded by as much as 1·5 per thousand.

Corrected for the age and sex constitution of our population* our "COMPARATIVE MEAN DEATH RATE" comes out at 15·24 per thousand, still showing 1·36 per thousand better than England and Wales as a whole. Calculated upon our population, this represents a saving during the year of about 45 lives.

The Average Age at time of Death.

1894.	East.	West.	Whole Borough.
1st Quarter	36·87	36·31	36·45
2nd ,, ...	35·22	33·74	34·59
3rd ,, ...	25·63	25·97	25·79
4th ,, ...	31·62	39·87	34·55
Whole Year	33·36	34·07	33·66
Average in past years ..	32·76	33·30	32·94

From this table it is seen that the age at death for the year, as a whole, was a little above the mean in the proportion of 33·66 to 32·94.

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* For full information of the method and application of this correction see Annual Report for 1893, page 5.

The General Infant Mortality was 128 deaths under one year, per thousand of births, against 137 in England and Wales for the same period, which in its turn was 10 under the mean proportion for the years 1884-94.

Deaths per 1,000 Births of Children under one year in Maidstone.

Year.	1st Quarter.	2nd Quarter.	3rd Quarter.	4th Quarter.	Whole Year.
1870	165	97	263	115	160
1871	258	107	278	117	190
1872	181	116	171	144	153
1873	136	118	246	127	157
1874	182	93	261	119	164
1875	187	106	157	165	154
1876	147	112	141	98	124
1877	211	140	187	84	155
1878	161	176	209	155	175
1879	135	145	122	165	142
Average.	176·3	121·0	203·5	128·9	157·4
1880	135	120	229	118	153
1881	120	119	122	64	106
1882	138	110	100	151	125
1883	218	79	122	139	138
1884	189	78	159	125	138
1885	140	75	187	139	133
1886	118	105	191	166	142
1887	80	59	158	114	103
1888	167	136	167	145	154
1889	132	99	173	137	135
Average.	143·7	98·0	160·8	129·8	132·7
1890	136	117	93	113	115
1891	140	113	150	157	140
1892	128	87	110	80	102
1893	64	90	222	80	111
1894	167	119	112	116	128

As respects the assigned causes of death, as distributed among the various classes of disease, Table III gives the usual particulars. As is customary, I will now proceed to deal seriatim, more or less in detail, with each of the constituent classes, commencing with The Seven Zymotics. The rate of deaths from these causes was only 1·18 per thousand in each division of the Borough, the average of past years being 2·00 and 1·43 in East and West respectively.

Of these Zymotics SMALL POX was more than usually prevalent, there were 29 cases; 27 in West Maidstone, 2 in East, causing 4 deaths, = a rate of 14 per cent. 20 of the cases arose during the 1st quarter, 4 each in the 2nd and 3rd quarters, and 1 in the 4th. The outbreak commenced with a batch of cases in George Street during the middle of February, seven weeks after the outbreak in Wyatt Street reported upon last year. The connection between the two outbreaks was circuitous and obscure, nevertheless I am satisfied it was real, and unfortunately the connecting link was made the more mischievous by the fact that the nature of the illness was overlooked and not brought under medical cognisance; the girl who was the intermediate subject of the disease never complained of illness; she was a member of a large household, with numerous family ramifications, in a densely peopled locality, so that when two fresh cases occurred a fortnight after she had shown symptoms of the disease, there was every appearance of its extensive prevalence. It was not therefore surprising that fresh cases occurred in batches at intervals during the next eight weeks, in spite of vigorous measures employed to check the evil, including house to house visitation, special facilities for vaccination, immediate isolation of the sick, temporary isolation of those who had been brought into closest association with the sick, and thorough disinfection of all infected persons, clothing and dwellings. That success attended the efforts to keep the disease within bounds was most certainly due to these extra precautions. Without the support of the Sanitary Committee, and the Borough Officers, and the active assistance of the Vaccination Authorities, I am sure we should have had a very serious epidemic; as it was our resources were strained, as will be shown when later I come to speak of the Hospital Accommodation.

MEASLES was so little prevalent that very few cases came to my knowledge, and no death arose from this cause.

SCARLET FEVER was notified in 99 instances, 59 being located in East and 47 in West Maidstone, causing altogether 5 deaths, 4 in East and 1 in West, equal to a case mortality of 5 per cent., which is less than half the usual (about 11 per cent.) mortality of Scarlet Fever. So that Scarlet Fever which, it must be remembered, was very widely prevalent in 1893, during 1894 abated in frequency, and exhibited but little tendency to fatality.

DIPHTHERIA was notified in 69, and MEMBRANOUS CROUP in 3 instances, 53 of these were in East Maidstone and 19 in West. Of the cases of Diphtheria 5 were fatal, and of Croup all died, so that the case mortality for the two combined was 11 per cent., which is a very low rate for this disorder; these numbers show that the disease was very mild in character, and only about one half as prevalent as it was during 1893. For the most part the cases were sporadic, it was chiefly located in East Maidstone, but at no time was localized in any school, neither was the milk supply in any way implicated.

WHOOPING COUGH claimed 14 victims, 6 in East, 8 in West, which is more than twice as many as during 1893.

TYPHOID FEVER was notified 11 times, and caused two deaths, one in each division. The two fatal cases were imported, one from Tilbury, the other from Southend, both being ill of the disease on arrival in Maidstone. The non-fatal cases were all mild; four concerned children of tender years, several were of doubtful nature, others associated with various insanitary conditions of drainage, and one only in which the drinking water was suspected of being the cause.

DIARRHŒA was as little prevalent as I have ever known it to be. This circumstance was no doubt principally due to the cold third quarter, the mean temperature during 10 out of the 13 weeks of that period being considerably below the average for the time of year, at the same time credit is due and may properly be taken for the effect of the extra flushing and disinfection of the sewers carried on at that time as an extra precaution against the possible invasion by Cholera. Six deaths in all were registered as due to Diarrhœa, 15 would have been an average number.

INFLUENZA.—This not being a notifiable complaint, it is impossible to say exactly to what extent it prevailed. Nine deaths, seven in East and two in West were attributed to it; but judging from the death roll which records excess of deaths from diseases of the Respiratory and Circulatory Organs, without any other apparent cause, climatic or otherwise, I am disposed to believe that Influenza was fatally prevalent to a small extent beyond that which the above numbers indicate.

PHTHISIS caused 38 deaths, 15 in East and 23 in West, = 1·31 per thousand, which is as near as possible our average number.

As respects the mortality from other classes of disease, this is set forth in *extenso* in Table III, and for the convenience of ready reference and comparison the following summary is given :—

Causes of Death.—Rate per 1,000.

	East Maidstone.		West Maidstone.		Whole Borough.	
	1894.	10 years average	1894.	10 years average	1894.	10 years average
Seven Zymotic Diseases	1·18	2·01	1·18	1·42	1·18	1·68
Other Zymotics...............	·35	·39	..	·27	·18	·33
Phthisis	·82	1·52	1·30	1·16	1·06	1·35
Other Constitutional Diseases..	1·18	1·69	1·12	1·27	1·15	1·49
Diseases of the Respiratory Organs	3·66	3·71	2·36	2·50	3·03	3·10
Diseases of the Organs of Circulation	1·41	1·41	1·30	1·02	1·36	1·26
Other Local Diseases	3 89	3·53	2·79	2·94	3·36	3·23
Developmental Diseases	1·21	2·57	1·05	2·14	1·15	2·36
Deaths by Violence	·59	·54	·43	·55	·51	·55
Causes ill-defined or not specified	1·21	1·08	·62	·91	·94	1·00

As will be observed this table exhibits a substantial reduction, with two trifling exceptions, upon the average mortality in every category.

For your further information the following table is given for the purpose of showing how Maidstone stood in respect to Zymotic disease, when compared with England and Wales as a whole, or Urban or Rural England separately.

Comparative Table of Zymotic Deaths per 1,000.

	All Causes.	Seven Zymotics.	Small Pox.	Measles.	Scarlet Fever.	Diphtheria.	Whooping Cough.	Fever.	Diarrhœa.
East Maidstone ..	15·59	1·18	..	..	·23	·47	·35	·06	·11
West ,, ..	12·19	1·18	·24	..	·06	..	·49	·06	·31
WHOLE BOROUGH.	13·93	1·18	·12	..	·15	·24	·42	·06	·21
England and Wales	16·6	1·76	·03	·38	·16	·28	·39	·16	·35
33 Great Towns ..	18·1	2·44	·04	·63	·21	·38	·48	·19	·50
67 Large Towns ..	16·0	1·68	·02	·31	·16	·19	·48	·20	·40
England and Wales Rural	15·7	1·33	·02	·24	·14	·23	·33	·14	·23

THE NOTIFICATION ACT.—The following is a summary of the Notifications:—

Diphtheria	69
Croup	3
Scarlet Fever	99
Typhoid	11
Continued Fever	1
Erysipelas	31
Puerperal Fever	5
Small Pox	29
Total	248

This most useful Act has now been in operation in this Borough for over four years, and the accumulating statistics are already becoming valuable and will eventually be of immense value. The following tables show how these statistics may be usefully applied in comparing the sum of notifiable sickness of one year with another.

SMALL POX.

Quarter.	1890.	1891.	1892.	1893.	1894.	Average.
1st	*	1	..	1	20	5·5
2nd	*	..	..	..	4	1·0
3rd	*	..	..	..	4	1·0
4th	..	..	..	1	1	0·5
Year		1	..	2	29	8·0

TYPHOID AND CONTINUED FEVER.

Quarter.	1890.	1891.	1892.	1893.	1894.	Average.
1st	*	4	2	4	5	3·75
2nd	*	2	3	10	3	4·5
3rd	*	2	3	11	2	4·5
4th	14	9	8	9	2	7·0
Year		17	16	34	12	19·75

* Notification Act not yet in force.

SCARLET FEVER.

Quarter.	1890.	1891.	1892.	1893.	1894.	Average.
1st	*	7	..	30	37	18·5
2nd	*	4	4	90	18	29·0
3rd......	*	4	15	79	27	31·25
4th......	6	5	25	107	17	38·5
Year		20	44	306	99	117·25

DIPHTHERIA AND CROUP.

Quarter.	1890.	1891.	1892.	1893.	1895.	Average.
1st	*	12	36	16	28	22·75
2nd	*	3	27	53	14	24·25
3rd......	*	5	15	48	17	21·25
4th......	17	13	28	46	13	25·0
Year		33	106	162	72	93·25

ERYSIPELAS.

Quarter.	1890.	1891.	1892.	1893.	1894.	Average.
1st	*	8	12	14	13	11·75
2nd	*	5	6	13	5	7·25
3rd.....	*	8	7	15	4	8·5
4th......	3	4	12	18	9	10·75
Year		25	37	60	31	38·25

PUERPERAL FEVER.

Quarter.	1890.	1891.	1892.	1893.	1894.	Average.
1st	*	1	3	2	3	2·25
2nd	*	..	1	2	2	1·25
3rd......	*	1	..	3	..	1·00
4th......	1	..	..	2	..	·50
Year		2	4	9	5	5·00

* Notification Act not yet in force.

TOTAL NOTIFIABLE ZYMOTICS.

Quarter.	1890.	1891.	1892.	1893.	1894.	Average.
1st	*	33	53	66	106	64·5
2nd	*	14	41	168	46	67·25
3rd	*	20	40	156	54	67·5
4th	41	31	73	183	42	82·25
Year		98	207	573	248	281·5

* Notification Act not yet in force.

Disease.	1894.	Average.
Small Pox	29	8·0
Typhoid	12	19·75
Scarlet Fever ..	99	117.25
Diphtheria	72	93·25
Erysipelas	31	38·25
Puerperal Fever.	5	5·0
Total	248	281·5

From a consideration of these figures it is seen that 1894 was decidedly more free than usual from Zymotics, particularly during the last 3 quarters, and except for the Smallpox in the first quarter, which in a manner may be regarded as being accidental, the year was remarkably free.

The Public Hospital.—The total of admissions during the year 1894 was 77, and comprise the following cases:—

Scarlet Fever	45
Diphtheria	4
Smallpox	28
Total....	77

The deaths amounting to 5—equal a mortality of 6·5 per cent.; the following table gives the numbers of day's rations for Patients and Staff, and the cost thereof:—

1894.	STAFF.				PATIENTS.			
MONTH.	NO. OF DAYS.	COST. £	s.	d.	NO. OF DAYS.	COST. £	s.	d.
January	155	9	2	4·6	516	22	14	4·6
February	140	8	4	8·8	421	18	17	9
March	169	9	18	10	508	23	10	2·6
April	178	10	9	4 8	320	14	15	9·1
May	155	9	2	4·6	155	7	4	7
June	154	9	1	2·4	176	8	2	4·8
July	186	10	18	9·7	364	18	15	10·9
August	162	9	10	7·3	349	17	3	9·2
September	150	8	16	6	275	12	19	11
October............	155	9	2	4·6	297	14	7	11·5
November	150	8	16	6	268	12	6	4·5
December	155	9	2	4·6	160	7	13	10·9
Total	1909	£112	6	1·4	3809	£178	12	11·1

The average length of stay for each Patient in the Hospital was 49½ days, and the cost for maintenance £2 6s. 5d., or about 11¼d. per diem, to which should be added the Staff maintenance, which raises the total cost per patient to £3 15s., or $15\frac{3}{10}$d. per diem.

Forty-nine and a half days' average duration of an ordinary case of infectious illness may appear unreasonably long, and so it is if the duration of the real illness is contemplated, but the fact of the case is that in most instances during the last three or even four of the seven weeks there is no real illness at all, the patients, so far as they themselves are concerned, are well and hearty; but unfortunately, as experience has proved over and over again, they are actively infectious; the infectiousness of some disorders, Scarlet Fever in particular being very persistent, out-lasting the true illness a long time. The practical effect of this unfortunate circumstance is often very tiresome, causing our Wards at times to be in the occupation of patients severally in the two various conditions, some really sick requiring quiet, others, convalescent, rude and boisterous; these latter giving by far the most trouble, would be better disposed of in a Convalescent Home, since they only require safe custody under suitable discipline. At the early part of the year the inconvenience of this state of affairs was so strongly manifested, that permission was accorded me to endeavour to find a place for temporary use, suitable for the purpose of receiving convalescents from Scarlet Fever. Three places came under observation, one in the Town (the old Assembly Rooms in Sandling Road), and two in the Country. The first mentioned of these, with very little adaptation, could be made almost an ideal Convalescent Home, without the smallest risk to the surrounding inhabitants; those in the country would have been less well adapted; in each case however objections were raised to the letting of the premises for the object in view, so nothing came of it.

About the same time we were even more seriously put to it by the want of accommodation for the housing of Small Pox suspects, whilst their houses were undergoing disinfection; this difficulty was fairly well met by the hire of a cottage in Hartnup Street, close by the Hospital Grounds. As the expedient was felt to be a makeshift, with the object of taking steps for the providing of better and permanent accommodation, I was instructed to bring up a Report upon the whole subject, including the Hospital accommodation and the provision of a refuge for suspects, for the consideration of the Sanitary Committee. This was done, and after discussion was referred to the Borough Surveyor, who was directed to prepare plans and estimates for carrying the proposals into effect; there the matter now stands, not forgotten, far less rejected, but as yet unfulfilled.

METEOROLOGY.

TEMPERATURE AND RAINFALL.

RAINFALL.—The Rainfall for Maidstone for the year 1894 was 30·76 inches, with three exceptions the highest record since 1870. In 1872 it was 39·51, in 1877 32·10, and 1878 31·29, the average for the 10 years, 1870-79, having been 27·39, and for 1880-89 23·79 inches. March, May, and December were dry months and the rainfall was under the average, for the other nine months it was above the average, during July, October, and November it was more than 50 per cent. in excess, amounting to 12·29 inches for the three months, against an average of 7·94 inches; the greatest rainfall of the year occurred during the 28th, 44th, and 46th weeks, when the amounts registered were 2·48, 2.31, and 2·87 inches respectively.

TEMPERATURE.—As a whole the year was a warm one, the 1st and 4th quarters being 1·7° and 4·5° above the mean, whilst the 2nd and 3rd quarters were 0·4 and 1·6 below the mean, the opening week of the year was very cold, after that it became warmer, and so continued until the middle of the 2nd quarter, from the last week in May until the 3rd week in October it was cold and sunless, November was fine, warm, and sunny, December the reverse. The hottest days of the year were the 1st and 6th July, when the shade temperature reached 82°, the coldest day was January 6th, when it fell to 10°.

THE WINDS.—Compared with former years, the following figures exhibit the departure from the average in excess or deficiency, in days:—

Year.	NW	N	NE	E	SE	S	SW	W
1894	−3	−½	+4½	+11½	−3¼	+1	−7	−2¼

HUMIDITY.—In this particular there was not much variation from the normal, the atmosphere during April, May, and November was very dry, during August and September, very damp, but for the year as a whole the air was drier by 1 per cent. than the average of the last 52 years.

	Mean for 1894.	Mean for 52 years.	Difference for 1894.
January	87	87	0
February	85	85	0
March	78	81	−3
April	73	80	−7
May	74	78	−4
June	76	75	+1
July	76	76	0
August	83	77	+6
September ...	84	81	+3
October........	87	89	−2
November	87	91	−4
December	87	89	−2
Mean..........	81·4	82·4	−1·0

SUBSOIL WATER.—I have now completed 10 years daily observations on this subject, and find the mean height of the Subsoil Water Level during that period to have been 198 inches below the surface at my laboratory. The mean highest point to which it rises is 186·75, and the mean lowest to which it sinks 205·48 inches, consequently giving a mean range of movement of 18·73 inches. The extreme highest level, 176·88, was reached during November last year, and the extreme lowest level, 212·4, occurred during August, 1885. The annual range of movement has fluctuated between a minimum of 10·32 inches in 1889, and a maximum of 24·48 in 1885.

1894 was characterized by the highest level that has occurred during the period of these observations; it was abnormally high throughout the year, and the lowest point to which it fell is barely an inch below the mean level of the 10 years; notwithstanding this high level of the Subsoil Water, its range, 22·08 inches, was much above the mean, 18·73, of former years. I have reason to believe this increased movement, when contrasted with the more stagnant condition, is salutary, probably because it is a means of washing and aërating the soil, purging and purifying it from disease organisms. My observations seem to indicate that the *quality* of Diphtheria is controlled by it; the reasons for this, together with the evidence upon which the belief is based, may be found in a paper read at the International Congress, held at Buda Pest last September, a copy of which I append to this Report. This contribution I trust will prove interesting, as it comprises particulars concerning the history of Diphtheria as it has affected this Borough, during the nine years 1885-93, set forth in graphic form in connection with the observations on the movements of the Subsoil Water.

Subsoil Water Levels.

Year.	Average for Year.	Highest.	Lowest.	Range.
1885	201·52	187·92	212·40	24·48
1886	202·81	188·64	211·68	23·04
1887	200·07	186·72	208·56	21·84
1888	198·50	189·84	203·28	13·44
1889	198·18	193·68	204·00	10·32
1890	199·23	192·24	206·52	14·28
1891	196·18	188·28	201·60	13·32
1892	195·76	182·16	204·00	21·84
1893	193·96	181·20	203·76	22·56
1894	193·89	176·88	198·96	22·08

In inches beneath the surface at the Laboratory.

GENERAL SANITARY CONDITION AND PROGRESS.

From Mr. Bunting, the Borough Surveyor, I learn that the following works of Sanitary interest have been carried out during 1894:—

"59 New Houses have been erected.

" 2 New Streets formed (Campbell and Hayle Roads).

"44 Houses and Buildings undergone alterations and additions.

" 8 New Buildings of Factory and Public Buildings class built.

" 2 Stables, etc., and alterations to same.

" 5 New W.C.'s.

"58 Connections to Main Sewers.

"New Surface Water Sewer laid from the River Medway, by All Saints' Church, along Knightrider Street and Upper Stone Street, to Loose Road, and the removal of an old defective brick sewer, also the disconnecting of about 30 house connections from the old brick surface-water sewer and connecting to the main sewer.

"New length of sewer, Water Lane, taking surface water from King Street, Albion Place, and Sittingbourne Road, into River Len.

"New Sewers, Sheal's Court Estate.

"Two ventilators to Main Sewer erected.

"Several defective and untrapped brick gullies removed, and replaced with properly constructed gullies.

The following list exhibits the various "NUISANCES DEALT WITH BY STATUTORY NOTICE OR OTHERWISE," by the Sanitary Inspector, Mr. Jackling. The sum of these items bears evidence of the large extent of the general work of Sanitation going on within the Borough.

Houses without drains, or reconstructed....................	210
Drains repaired and cleansed................................	400
Water Closets ditto	458
Houses provided with new Water Closets	100
Houses provided with additional Water Closets	8
Old Pan Closets with Container and D Traps removed	44
Water Closets provided with Water Supply and Flushing Apparatus	160
Soil Pipes removed outside dwellings and ventilated	30
Slop Sink and other Waste Pipes disconnected from Drains ..	152
Trapped Stoneware Gullies provided, in lieu of defective Brick and Bell Traps	294
Houses provided with Ash-pits or Dust-bins	230
Houses provided with new shooting, or repaired	60
Cesspools cleansed and filled up	11
House Refuse removed on complaint	10
Privies removed	2
Construct or Repair Urinals	6
Remove Pigs	6
Overcrowding	8
Houses cleansed and lime-washed	12
Remove Manure	9
Remove Pigeons, Poultry, and Animals	33
Houses supplied with Company's Water....................	48
House Roofs repaired	26
Back Yards of Dwelling Houses provided with new Concrete Pavement	149
Manure Pits constructed..................................	6
Old Drains Trapped from Sewer, and ventilated	4
Miscellaneous, not under above heads	30
New Glazed Stoneware Pipe Drainage laid (7,410 feet)	
Total..................	2506

PUBLIC WATER SUPPLY.—The results of the quarterly analyses of the samples of water from the four several Public Water Supplies are given in Table IV. These results on every occasion have been quite satisfactory, with the exception of those relating to to the Conduit Water during May. THE CONDUIT which had heretofore furnished a supply that had always been looked upon as our model for purity bore evidence of very serious pollution in the sample drawn on May 5th from the hydrant in the Sittingbourne Road. The fact was reported, the supply was stopped, and I was instructed to investigate the matter as to the nature, cause, and extent of the pollution.

A few particulars concerning this source of Water Supply are necessary in explanation of these matters, and will no doubt be interesting.

As is well known the Conduit water is derived from two sets of springs in the ragstone, situated on the London Road at the top of Rocky Hill. The water comes from the Westward, and is collected in two Reservoirs, the "Old" and the "New." The old Reservoir measures 35ft. long by 14ft. wide, and the new Reservoir 40ft. by 20ft. The water wells up from the bottom and sides of the Reservoirs and that derived from the old Reservoir, which lies at a higher level is allowed to overflow and mingle with the water in the new Reservoir. From measurements taken last May I found the yield at that time to be in gallons per diem as follows:—

Springs to Old Reservoir....	49,452	gallons.
,, New ,, ...	53,742	,,
Total....	103,194	,,

The product of these springs is conveyed from the Reservoirs over the New Bridge, across the river by two mains to a large tank, having a capacity of 12,000 gallons, at the back of the Mitre. From this tank it is distributed by means of public hydrants to various points in the lower parts of the town.

The polluted sample of May 5th had been drawn from the hydrant in the Sittingbourne Road. The first step was to ascertain whether the pollution affected the water supply as a whole, or whether it was limited to this particular hydrant; analyses of samples taken direct from each of the Reservoirs, and also the Mitre Tank, decided this point, and localized the mischief upon the Sittingbourne Road hydrant; whereupon, with the assistance of the Borough Surveyor, the main was stripped, and the cause of this pollution was found to be due to two holes in the water main, 17 inches below and 14 inches to the side of a surface gulley and an old disused earthenware drain in Clarendon Place. Of course the matter was soon and easily set to rights, but the pollution of the water in the service pipe still remained a curious fact, the *modus operandi* of which, not immediately apparent, deserves something more than a mere passing remark; it might be thought impossible that a water main, fully charged, without interruption, could, under the circumstances related, have imbibed polluted water from without; nevertheless in-suction had occurred, as was proved by the analyses to the extent of 10 or 15 per cent. at least. To account for this it must be borne in mind that the Sittingbourne Road hydrant is situated at the highest level to which the Conduit Water Supply can be made to flow, moreover the service pipe to this particular hydrant is very small, and is an extension from the Church Street service lying at a lower level; the consequence is the flow at Sittingbourne Road, at all times very languid, is greatly affected by the use, or non-use, of the hydrant in Church Street. Now when this latter is in full use, and perhaps other hydrants at even lower situations than Church Street, also in use at one and the same time there is a tendency for the Sittingbourne Road service pipe to empty itself in favour of the lower placed hydrants, and when the taps at these latter places are suddenly shut off, a wave of water-pressure is sent forward to the higher level; when this wave reaches the Sittingbourne Road hydrant the water recoils upon itself, and sets up a sudden and strong retreating current in the opposite direction, which produces the in-suction. This seemingly small matter ought not to be lost sight of, it teaches a practical lesson in hydraulics of the greatest sanitary importance. I can easily conceive of many existing situations, where the purity of an ordinary domestic water supply may be liable to a similar risk of pollution, the consequences of which, if the pollution chanced to be of a specific nature, might be disastrous.

Of Water from Private Wells, four samples only were submitted for analysis, all were found to be more or less impure and unfit for use as drinking waters, as the following results show:—

1894.	Description.	Total Solids.	Loss on Ignition.	Chlorine.	Nitrogen as Nitrates.	Ammonia.		Oxygen absd. in		Hardness.		Appearance in 2-foot tube.
						Free.	Alb.	¼ hr.	4 hrs.	Total.	Perm.	
Feb. 14	Goodwin's, Boxly. Rd.	29·2	1·9	3·6	·57	·32	·12	·023	·053	12·4	6·3	gr., dirty.
May 16	Tar Works, Tovil	44·3	2·7	2·3	·40	·10	·15	·019	·036	20·3	8·3	turb. gr., very dty.
July 19	Fair Meadow	64·8	2·4	5·6	·57	·06	·35	·036	·081	29·4	7·3	yell. green very tbd.
Dec. 15	Wheatsheaf Cottages.	37·8	2·8	2·2	·57	·48	·12	·009	·020	20·2	12·8	opg. grey.

FOOD AND DRUGS ACT:—26 samples only of Food have been submitted under this act during the year; three of the number, = 11·54 per cent., were found to be adulterated, one a sample of coffee to the extent of 46 per cent. of chicory, the other two of Whiskey, in each case diluted to a small extent below the legal limit.

ARTICLE.	RESULT OF ANALYSIS.
Milk	Pure.
Milk	”
Milk	”
Milk	”
Milk	”
Milk	”
Coffee	46 per cent. Chicory.
Butter	Pure.
Butter	”
Lard	”
Coffee	”
Butter	”
Butter	”
Butter	”
Milk	”
Milk	”
Milk	”
Milk	”
Milk	”
Milk	”
Whiskey	1·09 degree below legal limit.
Whiskey	Pure.
Whiskey	”
Whiskey	”
Whiskey	”
Whiskey	1·67 degree below legal limit.
Total 26.	= 11·54 per cent. adulterated.

There remain two topics that have engaged your attention during the year, which in a sanitary record must on no account be passed over in silence, each having an important bearing upon the sanitary welfare of the Borough.

The first of these concerns the Common Lodging Houses, and had for its object the remedy of their notorious ill-condition. The matter was brought on this occasion under the consideration of the Board by a numerously signed memorial; practically this was a revival of the agitation upon the same subject three years ago. Having gone very fully into the matter on the former occasion, in two reports dated February and March, 1892, which were published in my annual report for that year, it is not necessary to go over the ground again; all that need be said now, is that the memorial was referred to the Sanitary Committee, that deputations were appointed to visit other places and report upon the accommodation there found. In due course these reports were rendered, and were in favour of the establishment of Municipal Lodging Houses in Maidstone, but as yet nothing has come of it.

The other topic alluded to has fared better; it concerned the insufficient accommodation at the Public Baths. This deficiency is already all but made good; in a very short time the town will be in possession of two grand swimming baths, one for men, measuring 90ft. by 35ft. = an area 3,150 square feet, the other 47ft. 6in. by 21ft. 6in. = an area 1,021 square feet for women. This accomplishment alone will be enough to mark the year as one of sanitary progress.

I have the honour to be,
Mr. Mayor and Gentlemen,
Your obedient servant,
MATTHEW A. ADAMS,
Medical Officer of Health.

Trinity House, Maidstone,
March, 1895.

BOROUGH OF MAIDSTONE, 1894.

TABLE I.

AREA. The area is 4,008 acres, divided into two divisions, East and West, by Week Street, Gabriel's Hill, and Stone Street; all to the West, including the Western sides of those Streets, constituting West Maidstone; the East side, East Maidstone.

THE AREA OF East Maidstone .... 2,019 acres.
THE AREA OF West ,, ... 1,989 ,,

ELEVATION. The population reside at a mean Elevation of 70 feet above the sea level, ranging from 20 to 120.

HOUSES. At the census of 1891 there were West 2,693, East 3,314 =6,007 inhabited houses, containing on an average West 5·8, East 5·0 =Whole Borough 5·37 persons to a house.

ANNNUAL RATEABLE VALUE of Property in the Borough for the Poor Rate is £133,801.

DENSITY (1894) East..................... 8·38 persons per acre.
DENSITY (1894) West .... 8·08 ,, ,,

POPULATION, estimated to the middle of 1894. Total 33,011
East Maidstone............ 16,931.
West ,, ... 16,080.

BIRTHS. Males .... 419, Females .. 443 — Total 862

		Legitimate.	Illegitimate.
East Maidstone	493	481	12
West ,,	369	358	11

ANNUAL RATE OF BIRTHS PER 1,000....East Maidstone 29·11....West Maidstone 22·94 ....Whole Borough 26·11.

DEATHS. Males.... 231, Females.. 229 — Total 460
East Maidstone 264
West ,, ... 196
Whole Borough..460.

ANNUAL RATE OF MORTALITY PER 1,000 .. East Maidstone 15·59 .. West Maidstone 12·19 .. Whole Borough 13·93.

EXCESS OF BIRTHS OVER DEATHS, East Maidstone 229, West Maidstone 173, Whole Borough 402.

TABLE II.

Deaths at different ages, at rate per 10,000 per annum.

Period.	District.	Under 1 year.	1 to 5 years.	5 ,, 15 ,,	15 ,, 25 ,,	25 ,, 35 ,,	35 ,, 45 ,,	45 ,, 55 ,,	55 ,, 65 ,,	65 ,, 75 ,,	75 ,, 85 ,,	85 and above.	Total.
1st Quarter..	E	54·3	28·3	4·7	11·8	11·8	9·4	16·5	14·1	44·8	23·6	7·0	226·7
,, ..	W	32·3	24·8	11·9	22·3	11·9	11·9	11·9	29·8	24·8	14·9	4·9	193·9
2nd Quarter..	E	33·0	23·6	4·7	..	9·4	9·4	14·1	18·9	33·0	4·7	..	151·1
,, ..	W	27·3	12·4	4·9	7·4	7·4	11·9	12·4	2·4	19·9	12·4	..	116·9
3rd Quarter ..	E	30·7	23·6	7·0	2·3	7·0	7·0	2·3	7·0	14·1	4·7	2·3	108·6
,, ..	W	27·3	12·4	2·4	12·4	4·9	11·9	12·4	4·9	2·4	2·4	4·9	97·0
4th Quarter..	E	40·1	2·3	7·0	..	4·7	7·0	16·5	21·2	23·6	11·8	2·3	137·0
,, ..	W	19·9	4·9	..	4·9	7·4	..	7·4	12·4	11·9	11·9	2·4	79·5
Whole Year ..	E	39·5	19·4	5·9	3·5	8·2	8·2	12·4	15·3	28·9	11·2	2·9	155·9
,, ..	W	26·7	13·6	4·3	11.8	7·4	7·4	10·5	12·4	14·3	9·9	3·1	121·9

Average length of life in East and West Maidstone for each of the four quarters.

EAST MAIDSTONE.

	Deaths.	Years.
1st Quarter	96	36·87
2nd ,,	64	35·22
3rd ,,	46	25·63
4th ,,	58	31·62
Whole Year	**264**	**33·36**

Giving an average age for each individual of

WEST MAIDSTONE.

	Deaths.	Years.
1st Quarter	78	36·31
2nd ,,	47	33·74
3rd ,,	39	25·97
4th ,,	32	39·87
Whole Year	**196**	**34·07**

Giving an average age for each individual of

Average age attained at Death, during the whole year for the Borough at large = 33·66.

TABLE III.

Causes of Death, 1894, showing Rate per 1,000 per Annum for each District.

Period.	District.	Seven Zymotic Diseases.	Other Zymotics.	Phthisis.	Other Constitutional Diseases.	Diseases of the Respiratory Organs.	Diseases of the Organs of Circulation.	Other Local Diseases.	Developmental Diseases.	Deaths by Violence.	Causes ill-defined or not specified.	Total from all Causes.
First Quarter	East Maidstone ..	1·18	·94	1·89	·70	8·73	1·41	4·01	2·12	·23	1·41	22·67
	West ,, ..	1·74	..	2·23	1·99	4·97	2·48	3·98	1·49	·24	·24	19·39
Second ,, ...	East ,, ..	2·12	·23	·70	2·12	1·89	2·12	3·07	·94	·47	1·41	15·11
	West ,, ..	·74	..	1·49	·49	3·23	·74	2·98	·49	·49	·99	11·69
Third ,, ...	East ,, ..	1·41	·23	·23	1·18	1·41	·94	3·54	·70	·47	·70	10·86
	West ,, ..	1·74	..	1·24	1·24	·49	·74	1·99	1·49	·49	·24	9·70
Fourth ,, ...	East ,, ..	..	..	·47	·70	2·59	1·18	4·96	1·18	1·18	1·41	13·70
	West ,, ..	·49	..	·24	·74	·74	1·24	2·23	·74	·49	·99	7·95
Whole Year	East ,, ..	1·18	·35	·82	1·18	3·66	1·41	3·89	1·21	·59	1·21	15·59
	West ,, ..	1·18	..	1·30	1·12	2·36	1·30	2·79	1·05	·43	·62	12·19

N.B.—Zymotic Diseases include Small Pox, Measles, Diphtheria, Whooping Cough, Fevers, &c. Constitutional Diseases include Gout, Cancer, Scrofula, &c. Developmental Diseases include Premature Birth, Teething, Old Age, Atrophy and Debility, &c.

TABLE IV.

Analyses of the Public Water Supplies, 1894.

Month.	Total Solids.	Loss on Ignition.	Chlorine.	Nitrogen as Nitrates.	Ammonia.		Oxygen Absorbed in		Hardness.		Appearance in 2-foot tube.
					Free.	Alb.	$\frac{1}{4}$ hour.	4 hours.	Total.	Perm.	
WATER COMPANY.—FARLEIGH WATER.											
February 9th..........	32·1	2·1	2·2	·50	·01	·02	·008	·021	16·9	7·2	clear green.
May 7th..............	29·8	0·9	2·3	·55	·01	·02	·014	·027	15·4	7·1	clear bluish green.
July 28th	32·1	1·7	2·2	·50	·04	·03	·011	·022	18·7	8·4	clear green.
October 18th	31·0	1·7	2·2	·45	·03	·02	·010	·014	18·3	6·6	clear yellowish green.
WATER COMPANY.—BOARLEY WATER.											
February 9th..........	24·9	2·3	1·4	·40	·02	·02	·010	·024	14·5	4·7	clear bluish green.
May 5th..............	21·5	0·7	1·3	·45	·01	·03	·007	·024	12·5	4·7	pale clear blue.
July 28th	23·9	2·4	1·6	·40	·02	·01	·008	·015	15·7	4·4	clear greenish blue.
October 19th	24·3	2·6	1·4	·37	·00	·00	·008	·011	16·3	4·6	clear green.
WATER COMPANY.—COSSINGTON WATER.											
February 9th..........	19·0	0·9	1·2	·40	·02	·03	·006	·021	14·7	4·5	clear greenish blue.
May 5th..............	18·4	1·5	1·2	·45	·00	·02	·009	·019	12·7	4·6	pale clear blue.
July 28th	23·3	2·9	1·3	·40	·02	·02	·008	·015	14·7	5·9	clear greenish blue.
October 19th	20·2	1·6	1·2	·37	·00	·01	·008	·012	15·2	4·3	clear green.
PUBLIC CONDUIT.											
February 9th..........	31·9	2·3	2·3	·50	·02	·03	·011	·021	16·3	7·0	clear green.
May 5th..............	28·6	3·9	2·7	·40	1·29	·02	·044	·078	14·7	7·1	yellowish greenish, turbid.
July 28th	31·7	2·1	2·2	·57	·01	·04	·009	·015	19·2	8·3	clear bluish green.
October 19th	25·0	3·0	1·7	·40	·00	·01	·003	·010	17·5	4·3	clear green.

TABLE V.

RAINFALL IN MAIDSTONE, 1894, and excess or deficiency of Temperature.

FIRST QUARTER.				SECOND QUARTER.				THIRD QUARTER.				FOURTH QUARTER.			
Week.	Total Rain in inches.	No. of Days on which Rain fell.	Temperature.	Week.	Total Rain in inches.	No. of Days on which Rain fell.	Temperature.	Week.	Total Rain in inches.	No. of Days on which Rain fell.	Temperature.	Week.	Total Rain in inches.	No. of Days on which Rain fell.	Temperature.
1st	·40	1	−12·0	14th	·18	1	+4·6	27th	·69	1	+4·2	40th	·45	3	−0·8
2nd	·37	2	−0·4	15th	..	..	+9·4	28th	2·84	5	−3·2	41st	·39	2	+1·6
3rd	·34	4	+6·6	16th	·49	3	+0·8	29th	·40	6	−3·9	42nd	·25	1	−5·3
4th	1·11	4	+3·0	17th	·79	4	+1·1	30th	·34	2	+0·3	43rd	·92	4	+2·4
5th	·70	5	+2·3	18th	·66	2	−0·6	31st	·41	2	−0·1	44th	2·31	5	+7·3
6th	·24	2	+6·7	19th	·54	4	−0·2	32nd	·35	4	−2·0	45th	·46	3	+5·3
7th	·63	3	+1·9	20th	·05	1	−1·4	33rd	·69	2	−2·9	46th	2·87	6	+4·3
8th	·35	2	−5·3	21st	·69	4	−7·0	34th	·71	3	−3·6	47th	·13	1	+1·9
9th	·78	5	+3·8	22nd	·63	5	−6·5	35th	..	..	+0·5	48th	..	..	−1·0
10th	·38	3	+3·3	23rd	1·43	5	−2·1	36th	1·42	5	−6·5	49th	·37	1	−1·2
11th	·75	3	+1·5	24th	·49	4	−2·4	37th	·37	1	−3·2	50th	·66	3	+5·3
12th	..	..	+1·5	25th	·32	2	−1·1	38th	·39	3	−0·6	51st	·41	2	+4·6
13th	..	..	+4·5	26th	..	..	+2·5	39th	·42	2	−2·5	52nd	·19	4	+4·6
Total 6·05 inches.				Total 6·27 inches.				Total 9·03 inches.				Total 9·41 inches.			
				Total Rain in 1894 = 30·76.											

(A) TABLE OF DEATHS during the Year 1894, in the Urban Sanitary District of Maidstone, classified according to Diseases, Ages, and Localities.

	Mortality from all causes, at subjoined ages.								Mortality from subjoined causes, distinguishing Deaths of Children under Five Years of Age.																					
													Fevers.																	
(a.)	At all ages. (b.)	Under 1 year. (c.)	1 and under 5 (d.)	5 and under 15 (e.)	15 and under 25 (f.)	25 and under 65 (g.)	65 and upwards. (h.)	(i.)	Smallpox. 1.	Scarlatina. 2.	Diphtheria. 3.	Membranous Croup. 4.	Typhus. 5.	Enteric or Typhoid. 6.	Continued. 7.	Relapsing. 8.	Puerperal. 9.	Cholera. 10.	Erysipelas. 11.	Measles. 12.	Whooping Cough. 13.	Diarrhoea and Dysentery. 14.	Rheumatic Fever. 15.	Ague. 16.	Phthisis. 17.	Bronchitis, Pneumonia, and Pleurisy. 18.	Heart Disease. 19.	Injuries. 20.	All other Diseases. 21.	Total. 22.
EAST MAIDSTONE ..																														
Acres. Area 2019.—Males	135	42	18	5	4	34	32	Under 5		3	2	1							1		4					11		3	35	60
								5 upwds.		1													1		12	11	11	5	34	75
Females	129	25	15	5	2	41	41	Under 5			2	1							1		2	1				7		1	25	40
								5 upwds.			1	1		1			3		2			1			3	21	13	1	42	89
Including Deaths in West Kent Hospital as follows M. F.	8		2	1		4	1	Under 5																				2		2
								5 upwds.																		1		4	1	6
Total	264																													
WEST MAIDSTONE ..																														
Acres. Area 1989.—Males	96	21	11	2	10	30	22	Under 5	1												5	2				8	1	1	14	32
								5 upwds.	2																10	6	8	6	32	64
Females	100	23	10	5	7	33	22	Under 5	1												3	3				5			21	33
								5 upwds.		1				1											13	13	11		28	67
Including deaths in Kent County Lunatic Asylum as follows M. F.	2					1	1	Under 5																						
								5 upwds.																					2	2
Total	196																													
Totals	460	111	54	17	23	138	117	Under 5	2	3	4	2							2		14	6				31	1	5	95	165
								5 upwds.	2	2	1	1		2			3		2			1	1		38	51	43	12	136	295

The subjoined numbers have also to be taken into account in judging of the above records of mortality.

(a.)	(b.)	(c.)	(d.)	(e.)	(f.)	(g.)	(h.)	(i.)	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.
Deaths occurring outside the district among persons belonging thereto.	55	3	1			19	32	Under 5																		2			2	4
								5 upwds.																	5	2	8		36	51
Deaths occurring within the district among persons not belonging thereto.	164	1			10	102	51	Under 5																					1	1
								5 upwds.						1											36	14	20		92	163

(B) TABLE OF POPULATION, BIRTHS, AND OF NEW CASES OF INFECTIOUS SICKNESS coming to the knowledge of the Medical Officer of Health, during the year 1894, in the Urban Sanitary District of Maidstone; classified according to Diseases, Ages, and Localities.

	Population at all Ages.				New Cases of Sickness in each Locality, coming to the knowledge of the Medical Officer of Health.													Number of such Cases Removed from their Homes in the several Localities for Treatment in Isolation Hospital.												
									Fevers.													Fevers.								
(a.)	Census 1891. (b.)	Estimated to middle of 1894. (c.)	Registered Births (d.)	Aged under 5 or over 5 (e.)	Smallpox. 1.	Scarlatina. 2.	Diphtheria 3.	Membranous Croup. 4.	Typhus. 5.	Enteric or Typhoid. 6.	Continued. 7.	Relapsing. 8.	Puerperal. 9.	Cholera. 10.	Erysipelas. 11.	12.	13.	Smallpox. 1.	Scarlatina. 2.	Diphtheria. 3.	Membranous Croup. 4.	Typhus. 5.	Enteric or Typhoid. 6.	Continued. 7.	Relapsing. 8.	Puerperal. 9.	Cholera. 10.	Erysipelas. 11.	12.	13.
EAST MAIDSTONE ..	16,548	16,931	493	Under 5		12	19	2		1					1				5											
				5 upwds.	2	39	30	1		2	1		4		14			2	17	1										
WEST MAIDSTONE ..	15,597	16,080	369	Under 5	5	8	2			1					1			5	3											
				5 upwds.	22	40	18			7			1		15			21	20	3										
Totals	32,145	33,011	862	Under 5	5	20	21	2		2					2			5	8											
				5 upwds.	24	79	48	1		9	1		5		29			23	37	4										

SPECIAL REPORT

ON THE

INFECTIOUS HOSPITAL ACCOMMODATION.

To the Chairman of the Sanitary Committee.

In my Annual Report for 1894 I have already drawn attention to the inadequacy of our Isolation Accommodation. Since those passages were written the outbreak of Small Pox in Brunswick Street has so emphasized this insufficiency that it appears desirable to call your attention specially to the circumstances of the case as they now present themselves, in order that they may be examined by the light of present practical experience. The conditions in default are threefold.

I.—The want of more beds.
II.—The want of separation beds, and
III.—The want of a refuge for suspects.

To begin with, I will recall to your memories some of the facts connected with the establishment of the present Hospital. 15 or 20 years ago Isolation Hospitals, as we now understand such institutions should be, were the exception, before then in many cases they were veritable pest houses, and such had formerly been the case in Maidstone. It was during 1883, as a result of the Report I made to your Board upon an epidemic of Small Pox in 1881, that our present Hospital was built. The enquiry that led to this result was a laborious one, visits were made to the Local Government Board at Whitehall, numerous consultations were held with that Board's Medical and Architectural Officers, Inspectors from thence were sent here, and in the end, as is usual in such cases, the advice given, though accepted readily enough in principle, was somewhat grudgingly followed in practice, that is to say the accommodation of from 30 to 32 beds that we had been advised to provide as a minimum was cut down to 20.

Eleven years have passed, and just as might be expected, our experience has taught us two things; first, that 20 beds are sadly too few, and secondly, that their arrangement is such that for all practical purposes the 20 we are in possession of on occasions are reduced to eleven, just about a third of the fewest number calculated to be sufficient for our supply in ordinary times.

Recent occurrences having brought these defects into such strong light, it appears to me, for the purpose now on view I cannot do better than relate the actual circumstances connected with the administration of the Hospital just as they have occurred during the last few weeks.

As is well known to the Board, for a year or more there have been widespread epidemics of Scarlet Fever and Diphtheria, here, in the surrounding district, and in London, so extensive as entirely to have outrun the capacity of the Hospital, indeed, a long while since, it became necessary to devote the whole of our scanty accommodation to Scarlet Fever alone, to the exclusion of Diphtheria, and even with this limitation our 20 beds were too few to keep pace with the increase of this one disorder, so that at last it became nesessary to limit the admissions to the most urgent and potentially dangerous cases of Scarlet Fever alone.

Matters stood thus at Christmas time, both blocks, North and South, were occupied by Scarlet Fever, and though the struggle was severe we were just holding our own, and events appeared decidedly inclined to turn in our favour, when of a sudden there came a case of that most detestable disease, Small Pox. At once our painfully sustained plans for subduing the Scarlet Fever were overthrown, for from that moment the half of our means for combating the Scarlet Fever were literally torn from us; the North block with the whole of its 10 beds had to be emptied of the Scarlet Fever, disinfected, and given over to one solitary case of Small Pox. There was no help for it, it was imperative, for great as the sacrifice was, the most important thing to be done at that moment was to strangle the new foe outright at the onset, even at the cost of parting with the half of our strength for wrestling with the old foe. In the midst of this dilemma came the case of Clinch's children, ill of Scarlet Fever, in a small eating-house, where it was impossible to isolate them, and carry on the business at the same time on the same premises. You may imagine how we begrudged the monopoly of the half of our hospital accommodation by the single case of Small Pox; but for that circumstance Clinch's children might easily have been provided for in our own Hospital, as it was there was no possibility of this, and the circumstance you will remember led to a somewhat acrimonious discussion, which ended in the Board being put to the expense of hiring for six months and furnishing a house for the especial service of those children, at the cost of a considerable sum of money, every farthing of which might have been saved, irrespective of the extent of our Hospital accommodation, had the arrangements of the Hospital been otherwise than what they are. To make myself clear on this point, I must ask you to allow me a moment to explain in detail the plan upon which the Hospital is constructed.

It consists of four buildings; an Administration block, a Disinfection block, and two Fever blocks. It is with these last that we are now concerned. Each of these Fever blocks is adapted to receive 10 patients, and consists of four apartments and Sanitary offices; two of these apartments are for patients, one (A) provided with six beds, the other (B) with four; between these A and B wards are placed a Bath-room and Kitchen or Duty-room, this latter is for the nurse in charge, whence she commands a full view of the patients in both A and B wards. Two wards are necessary for the separation of the sexes, otherwise A and B are pervaded by the same atmosphere, and might, except for the separation of the sexes, almost as well be joined in one apartment, for it is absolutely impossible to isolate A from B in such a manner that the two wards could be employed for two different kinds of infection at one and the same time, without the certainty of the two sorts of infection mingling, and the victims of one kind of disorder being made liable to suffer from both. It follows therefore that one disease only can be treated at one time in the two wards that pertain to each one block, North and South separately, or two diseases in the two blocks, North and South together; and further, that a single case of any one infection, as long as there are no others of the same nature, monopolizes the whole of one block, to the exclusion of cases of any other sort of infection that may be requiring isolation at the same time.

For this state of affairs there is but one remedy, and that is the construction of a supplementary block, arranged with separate non-communicating apartments, each containing at the most two beds, so that when a single case of an urgent nature occurs, it may be lodged in a distinct detached part of the establishment, out of reach of danger from or to other patients suffering from diseases of another kind.

There are other purposes for which separation wards are sometimes required; for instance, it occasionally happens at the commencement of a disorder that for some hours, a day or so perhaps, it is impossible to determine its precise nature, sufficient time being required for the development of the characteristic symptoms, and yet it may be of the greatest importance that no delay shall occur before isolation is effected, for such delay might lead to the spreading of the disease right and left. On the other hand the patient must on no account be put to the risk of contracting the infection he appears to be sickening for until the truth of the matter can be ascertained beyond doubt; mistakes arising from this predicament have often been recorded, and such mistakes cannot always be avoided without the accommodation of separation wards, where doubtful cases may be placed until an error of diagnosis is no longer probable.

Another reason for separation wards, and a most tremendously urgent one too, arises when a patient becomes maniacal and consequently alarming, disturbing, and even dangerous to his fellow patients. I have known the wildest scenes of violence attend upon cases of this kind. One Sunday morning, I was witness to a scene of this description which I shall never forget, in a small room in Tufton Street was a bargeman, ill of Small Pox, a powerful fellow, violently mad, having broken loose from all restraint, after smashing furniture, windows, window-frames and doors, he was assaulting the nurses with fragments of the wreckage. Fancy such an occurrence in a 10-bed ward full of sick patients, it is too horrible to think of, and a great mercy that so far we have escaped from such a scene.

Then again it sometimes happens that a poor sufferer in a bad case of Small Pox becomes offensive from the stench given out by the sores, so as to become an insufferable nuisance and detriment to the fellow occupants of his ward; in such a case a separation ward is almost indispensable.

These are some and there are other arguments which might be brought forward in support of the necessity for separation wards, but the foregoing are the chief, and I will not detain you on this point longer, but proceed to give reasons for asking for.

A REFUGE FOR SUSPECTS.—And inasmuch as *practice* is ever more instructive than *precept*, again I ask you to follow the course of recent events. The first case of Small Pox, to which I have had occasion to allude was notified on Boxing-day evening. The sufferer was a man on a visit to his sister and brother-in-law, residing in a small four-roomed cottage in Astley Street; two of the rooms were bed-rooms, and two were sitting-rooms; there were nine occupants of this small house, viz., the householder, his wife and two children; the sick brother-in-law, a married sister along with her husband and infant child, and another relative, a single young man named White; all these latter were visitors.

The sick man had one of the four rooms to himself; the infective stage of the disease was about a week old; but its true character had not been discovered, or at all events notified, until that day, so that free intercourse had been going on between him and the other members of the family, more especially his sister, the wife of the householder, and the young man White.

Let us reflect upon the conditions of the sanitary problem we were thus called upon to face. Here was a tiny house, overcrowded and steeped in the infection of Small Pox; besides the sick man himself were eight individuals, members of three separate and distinct families, all intimately associated with the sick man; concerning these eight persons it was impossible to predict whether any, and if so who, had taken the disease; time alone could decide how far the mischief had already extended, so that the premature dispersal of them to their several homes might spread the disease to other households. Besides all this there were the infected clothing and furniture, and the dwelling itself, each and all liable to become either active or passive agents of contagion. What was to be done? Obviously there were three main lines of procedure:—

1.—To remove the sick man out of reach of mischief to others.

2.—To withdraw the suspects from further risk of harm to themselves.

3.—To purge the persons and things that had been exposed to contamination from passive infection resting upon them.

I have already related how, in consequence of the whole of the hospital being then in the occupation of Scarlet Fever patients, valuable time was necessarily lost in evacuating the North block, disinfecting and preparing it for the reception of the Small Pox; but even when this was done, and the active source of the infection put out of harm's way, our difficulties were by no means overcome. The chief of these were:—

How to withdraw the suspects from further risk of harm? and

How to purge their bodies, clothing, house and furniture, from the infection in which they were steeped?

To accomplish these things under such circumstances a properly prepared place is required, consisting of two rooms free from infection. In one of these the suspects may be made to divest themselves of their infected clothing, and then to pass at once to a disinfecting bath in the other room, where, after being cleansed under skilled inspection, re-clothed in infection-free garments, they may be sent about their business or lodged for a few days in seclusion under observation and until the period of incubation has passed. But in our case the point was. Where could they go to be disinfected? And after they were disinfected. Where were they to be lodged? They could not be disinfected in the infected house as long as they were surrounded with infected goods and chattels, to have disinfected them there if such were otherwise practicable would have been folly; nor on the other hand was it possible to disinfect and purify the dwelling and its contents whilst the inhabitants were there, for that purpose the house had to be vacated for a day or two at least, to allow for the fumigations, &c. Meanwhile where were these people to go to? Naturally it is a difficult thing, indeed almost impossible for persons in such circumstances to find others willing to receive them. To meet such cases as this, Section 15 of the "INFECTIOUS DISEASE PREVENTION ACT," imposes upon Sanitary Authorities the duty of providing free temporary shelter, with necessary attendance, for members of any family in which infectious disease has appeared, who have to leave their dwellings to allow of disinfection by the Sanitary Authority. It is a provision of this kind of a permanent character that we want, over and over again we have had to extemporize in a bungling fashion something of the sort; at the present time we rent a house at the corner of Hartnup Street, once we had a row of cottages in Milton Street, another time we hired a building in Sandling Road, so that on and off the expense of this has been thrown upon the Board, but unfortunately the expense has been made more expensive and far far less serviceable by the exigencies of the occasion, and the hostility aroused by the alarm of the inhabitants of the localities involved when the emergency has arisen. Sometimes it has been quite impossible on the spur of the moment to obtain the kind of accommodation required; such was the case in the instance I am relating, and the best that could be done was to lodge the suspects in the Hospital itself, under the same roof though not in the same room with the Small Pox patient. This proceeding was of course utterly wrong in principle—for these people whilst they were being disinfected were still breathing a Small Pox infected air, and had to be bathed and re-clothed in a room surrounded by objects, and an atmosphere, that certainly could not be accounted free from Small Pox infection, although every effort was made to make them so as nearly as possible, so that when they left the Hospital to return to their disinfected home, even if they themselves escaped, it was impossible to feel sure that there was no risk of their infecting others—however in the circumstances it was the best thing that could be done.

These facts I think should convince the Committee of the necessity of extending the Hospital accommodation in the manner indicated. I have consulted with the Local Government Board Officers and I am encouraged to think that the undertaking need not be very expensive.

And having regard to the fact, for the reasons above stated, that judicious addition will not only provide its own equivalent of accommodation, but will also, at the same time, develope and render available the already existing accommodation over and above what it is at present, to the extent of something like 45 per cent., surely an expenditure in such a direction cannot fail to recommend itself as much for economy as utility.

MATTHEW A. ADAMS,
Medical Officer of Health.

26th February, 1895.

In continuation of my contribution to the 7th International Congress, I have the honour of laying before you an account of three additional years' observations (1891-93) upon "THE MOVEMENTS OF THE SUBSOIL WATER IN RELATION TO THE OCCURENCE OF DIPHTHERIA IN MAIDSTONE."

HAVING regard to the complicated nature of the problem, this extended experience not only amplifies and strengthens in a most remarkable manner the conclusions already presented for your consideration —but in addition it furnishes a clue to an explanation of the QUALITY as well as the QUANTITY of prevailing Diphtheria.

To put myself *en rapport* with those who may not remember the points of the argument, I will re-state them in the fewest words possible.

1.—It is assumed that DIPHTHERIA is primarily due to the special micro-organism BRED AND BORN IN THE SOIL.

2.—That given the special organism implanted upon the soil, the initial factor that determines its PROPAGATION is the condition of the soil with respect to moisture, temperature, aëration, and organic pollution.

3.—That its DISPERSAL from the soil to persons living upon the soil is due to movements of the Subsoil Air. To which I would now add another conclusion, viz:—

4.—That the QUALITY OF THE DISEASE, as measured by its fatal effect, is controled by the RANGE of the movements of the Subsoil Water.

Time not allowing of a statement of the grounds upon which these conclusions are based, I will proceed to demonstrate the result of my further observations by means of the diagram placed before you, which exhibits the rise and fall of the Subsoil Water, along with the corresponding prevalence of Diphtheria, week by week, for the years 1885-93; the actual extent of the movement of the Subsoil Water for each week being indicated by the position and length of the corresponding blue block, and of the Diphtheria prevalence by the red and black blocks, the black indicating the fatal cases; each of course plotted in a position corresponding with the date of its origin.

My remarks shall be arranged under three heads:—

I.—As to the facts relating to the movements of the Subsoil Water.

II.—As to the facts relating to the prevalence of Diphtheria.

III.—As to the relationship between the two sets of facts.

I.—In the first place, looking at the diagram as a whole for the entire nine years, we observe a striking similitude between the three first years' records; each of these three years has its well marked high tide during the cold season, and equally well marked low tide during its hot season, the transitions being gradual.

In contrast with this, during the four succeeding years, 1888-90, the tides are almost completely lost, being replaced by irregular and often abrupt oscillations of an indefinite and limited character, often misplaced or transposed in respect of time, so that high tides came when low tides were expected, and *vice versâ*; examples of this may be seen in the third quarters of 1888 and 1890 and first quarters of each of the years 1888-92.

Next I will ask you to observe that the range of movement was greatest in 1885, year by year becoming less, till in 1889 when it had become reduced to 42°/₀ of what it had previously been; since then the yearly range has graually expanded to within 7°/₀ of what it was in 1885.

It follows as a consequence of this variation in the yearly range of movement of the Subsoil Water, that the condition of the Subsoil as respects its moisture and aëration varied proportionately. The extent of this variation may be roughly appreciated by allowing the eye to follow the 17ft. line by which it is demonstrated that on four occasions only has the water fallen low enough to embrace a dry space beneath the 17ft. level, that is to say 1885-86-87 and to a small extent, though in a different position as respects time, in 1890; for mark you in 1890 the occurrence was postponed from the third to the fourth quarter, moreover during the third there had been interposed a very steep high tide.

In consequence of the repeated absence of the summer low tide, the soil became more and more waterlogged; this is made manifest by the chart for 1893, which exhibits a curve distinctly of a type similar to those for 1885-87, and having abundant range, with, however, this great difference: the water level never descended below the 17ft. line but on the contrary it stood on a much higher level throughout the whole of the year than it had done in any previous year.

Another feature that must not be overlooked is the occasional sudden and violent change of level, examples of this are seen to have occurred in the third quarters of 1888 and 1890, and fourth quarter of 1891-92.

II.—As to the facts relating to the Diphtheria prevalence, the record is complete as respects the fatal, but not for the non-fatal cases; during the first three or four years, before the notification act came into operation I had no reliable source of information concerning those that were non-fatal.

Taken as a whole it is, however, abundantly manifest that during 1885-86-87 Diphtheria was scarce, and year by year becoming more so, until the fifth week of 1888, which may be regarded as the date of the commencement of a severe and prolonged epidemic. During the middle of 1888, for a period of 17 weeks, there was a pause, followed by a more serious outbreak in the middle of the third quarter, which increased and became more fatal during the fourth quarter; thence forward throughout 1889-90 the epidemic waxed in violence and volume, continuing through the five succeeding years, though with obvious abatement during the first three quarters of 1891, but suddenly breaking out afresh with intensified virulence during the fourth quarter of that year, growing more and more plentiful right on through the next two years to the end of 1893, becoming less fatal as time went on.

As a matter of special remark I would have you observe that near about the junction of the third and fourth quarters there has usually been a very notable mitigation of the disease; for instance, in 1889 six consecutive weeks passed without a case, in 1890 four weeks, in 1891 six weeks, in 1892 there were twelve, interspersed with non-fatal cases, and in 1893, although there was no positive exemption, for seven weeks there was no fatal case.

I will conclude my remarks under this head, by pointing out that the case mortality, commencing at 43·0°/o in 1889, dropped to 18·7°/o in 1890, rose again to 36°/o in 1891, and fell to 19·0°/o, and finally 14·6°/o in 1892-93 respectively.

III.—All that now remains is to show how these facts are connected.

In setting before you what I consider to be the evidence of the relationship between the movements of the Subsoil Water and the prevalence of Diphtheria, I must again ask you to allow me to assume, as a working hypothesis, that the germ of the disorder resides in or upon the soil, and by one cause or another is liable to be displaced and dispersed along with the Subsoil Air, into the air we breathe, and in this manner invade our bodies. This admission being made, the foregoing facts readily fall into their places, and much that concerns this otherwise mysterious disorder becomes as light as day.

By general acceptance, analogy and observation both justify the belief that damp close stagnant states of the atmosphere promote, whilst the opposite conditions oppose prevalence of Diphtheria. In these records we have, as regards the Subsoil, evidence of these opposite conditions having at various times prevailed, and, broadly speaking, right through the nine years, from beginning to end, a strict concordance may be traced between soil dampness and Diphtheria on the one hand, and absence of Diphtheria and soil dryness on the other hand. But the dampness and dryness have their appropriate seasons, and so long as the order of this occurence is preserved, health is maintained. As long as the soil is well washed by the winter's high tide and afterwards dried and aërated during the summer's low tide all goes well, Diphtheria is kept in abeyance; but so soon as these salutary movements are arrested, or their order disturbed, Diphtheria gets the mastery, reaching its acme of violence when stagnation is most complete; and I wish to lay particular stress upon the fact that the virulence of the disorder increases with the stagnation of the soil air. This fresh developement of my observations, besides affording valuable support to the general argument, also shows that the QUALITY as well as the QUANTITY of this disorder varies in obedience to the circumstances concerning the Subsoil Water, there being an agreement, in the inverse ratio, between the case mortality from Diphtheria and the range of the movements of the Subsoil Water.

For the first four years the records as respects non-fatal cases is too imperfect to allow of a calculation being made of the case mortality; 1889 is the first year when I can do this with anything like confidence. The range of the movement of the Subsoil Water that year was only 10·32 inches, and the associated case mortality from Diphtheria was 43·0°/°; in 1890 with the range increased to 14·28, the mortality fell to 18·7°/°; in 1891, with the range reduced to 13·32, the mortality rose to 36°/o; and during the last two years, as the range increased to 21·84 and 22·56, so the mortality sank to 19·0°/o and 14·6°/o, in accordance therewith.

Thus far we have dealt broadly with the facts, let us now study them more in detail. We have said, a drying of the soil in the summer quarter is propitious; observe, there is generally some indication of this drying process even in unfavorable years, and invariably in association with it either a cessation, abatement, or attenuation of the disease. In 1889, our very worst year, there are six weeks made free; in 1890, four weeks; in 1891, six, and if we except one solitary case, nine weeks; in 1892, for twelve weeks there are no fatal cases, and for seven of these none at all; and in 1893, the disease was so attenuated, that for seven weeks though there were many sore throats, not a single fatal case.

On the other hand I would have you remark how that a rise of the Subsoil Water taking place at this time of the year is invariably accompanied or immediately followed by a fresh outbreak of the disease, or an increase of its volume or violence, and the more sudden and considerable the rise, the more pronounced the effect; for example, it was to a rise of this sort in the midst of the summer of 1888 that we may attribute the starting point of our epidemic; the less sudden rise in 1889 being spread over three or four weeks, and not completed till the beginning of November when the colder season had set in, produced an effect which, though obvious, was of shorter duration and smaller dimensions. The following year, 1890, furnishes a most interesting and instructive chart, in which the summer fall commences in the middle of the second quarter, but is suddenly interrupted and reversed by a rapid rise in the second week of the third quarter, after which the fall re-asserts itself and ultimately the water level reaches a lower point in the middle of the fourth quarter than it had done any previous time since 1887; corresponding with these movements, what do we find? The beginning of the summer fall is, as usual, attended by a mitigation of the disease, four out of five of the last weeks of the second quarter are free of Diphtheria, but the moment that the tide turns, and the misplaced rise of the second week of the third quarter takes place, a whole cluster of cases occur; and again when the fall re-establishes itself, away goes the Diphtheria, and four more consecutive weeks are absolutely free, but no sooner does the autumn rise set in, than back again it comes. In a similar way the order of occurrences may be traced through the remaining years, but it is not necessary that I should consume your time by mere reiteration of similar facts. I may however point out that the sinking of the tide below the 17ft. line in 1890 appears to have had a mitigating effect right into 1891, for it was not until after the sudden and impetuous rise in the autumn of that year that the disease again became seriously prevalent.

In conclusion, with two sets of phenomena extending over so long a period as nine years presenting points in order of occurrence in such circumstantial and frequent agreement, I would ask, is it possible to escape from the conclusion that these two things, otherwise so distinct, are as respects this particular matter related as cause and effect? Such is my belief, but I feel it as much a duty as a pleasure to submit the question to the judgment of the Congress.

NOTE:

The two chief agents concerned in the discharge of the soil air into the atmosphere we breathe, are:—

I.—REDUCTION OF ATMOSPHERIC PRESSURE, which acts by aspiration.

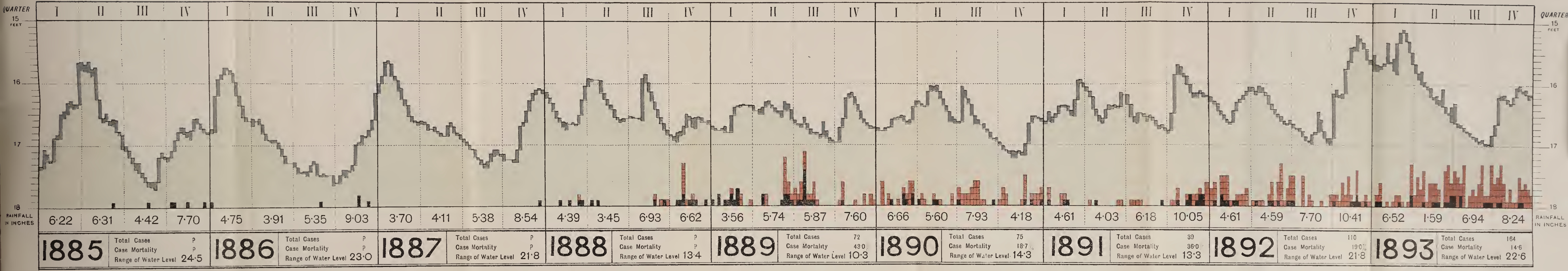
II.—RAINFALL, which operates by compression.

Probably the latter is by far the most effectual, though no doubt, both often act in concert. The way rainfall operates, especially when sudden and copious, is as follows:—The outside uncovered soil receiving the rain becomes temporarily sealed by moisture, and the underlying imprisoned ground air is driven downwards and laterally beneath protected parts such as are sheltered by buildings, and so finds an easy way of escape upwards through the unwetted surfaces that underlie buildings. Therefore the tendency for ground air to be forced into dwellings, depends upon the relative proportion that the uncovered bears to the covered area, consequently, in country situations, with relatively far more uncovered area than in towns, rainfall may be expected to be more effective. This appears to be one reason for the rural proclivity of Diphtheria; more especially, as what with piggeries, middens, cesspools, and farm yards, the area immediately surrounding country houses, is in many instances, far more befouled than that around town houses.

DIPHTHERIA IN RELATION TO HEIGHT AND FLUCTUATION OF SUBSOIL WATER AT MAIDSTONE.

The Cases of Diphtheria are represented in Red and Black blocks, the black showing the fatal cases. The number of cases that originated in the respective weeks is indicated by the sizes of the red and black blocks

The Subsoil Water Level is represented in Blue. The amount of fluctuation for the respective weeks is indicated by the sizes of the blue blocks



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